

### CLAIMS

The embodiment of the invention in which an exclusive property or privilege is claimed is defined as follows:

1. A method for manipulating genetic material, the method comprising:
  - a) disrupting cells so as to liberate genetic material contained in the cells;
  - b) contacting the genetic material to a column in a manner to cause the genetic material to become immobilized to the column;
  - c) labeling the immobilized genetic material; and
  - d) eluting the labeled material from the column.
2. The method as recited in 1 wherein the step of labeling the genetic material further comprises maintaining the column at a temperature of between 45 °C and 100 °C.
3. The method as recited in claim 1 wherein the column comprises a means for subjecting the silica to pressure.
4. The method as recited in claim 3 wherein the pressure means is a syringe.

1           5.     The method as recited in claim 1 wherein the step of labeling  
2 the genetic material comprises:

- 3           a)     contacting double-stranded nucleic acid molecules of the genetic  
4 material with radical-generating complexes for a time and at concentrations sufficient to  
5 produce free-aldehyde moieties;  
6           b)     reacting the aldehyde moieties with amine to produce a condensation  
7 product; and  
8           c)     contacting the condensation product with a chromophore.

1           6.     The method as recited in claim 5 wherein the step of contacting the  
2 condensation product with a chromophore further comprises reducing the condensation  
3 product and cross-linking the reduced condensation product with the chromophore in  
4 one reaction step.

1           7.     The method as recited in claim 1 wherein the column is a solid substrate  
2 selected from the group consisting of silica, ground glass filter, pulped glass filter,  
3 HNO<sub>3</sub>-washed glass filter pulp, HNO<sub>3</sub>-washed gel, HNO<sub>3</sub>-washed diatoms, silicic acid  
4 400 mesh silica gel, SPE-SIL and combinations thereof.

1           8.     A two-buffer process for manipulating genetic material, the process  
2 comprising:  
3           a)     contacting cells containing the genetic material to a silica column;  
4           b)     creating a first fraction of cell detritus and a second fraction containing the  
5 genetic material;  
6           c)     confining the genetic material to the column;  
7           d)     removing the cell detritus;  
8           e)     subjecting the genetic material to radicals so as to produce reactive  
9 aldehyde groups on the genetic material; and  
10          f)     attaching chromophore to the genetic material.

1           9.     The process as recited in claim 8 wherein the genetic material is  
2 contacted with radical in aerobic conditions.

1           10.    The process as recited in claim 8 wherein the genetic material is con-  
2 tacted with radical in anaerobic conditions.

1           11.    The process as recited in claim 8 wherein the step of creating a  
2 fraction of cell detritus and the genetic material comprises contacting the cells with a  
3 lysis buffer.

1           12.    The process as recited in claim 8 wherein steps a) through f) occur in  
2 approximately 20 minutes.

1           13.    The process as recited in claim 8 wherein the two buffers comprise a first  
2 buffer to lyse the cells and a second buffer to attach the genetic material to the column.

1           14.    The process as recited in claim 13 wherein the first buffer and second  
2 buffer contain guanidine thyocyanate and EDTA.

1           15.    The process as recited in claim 13 wherein the first buffer and the second  
2 buffer contact the cells simultaneously.

1           16.    The process as recited in claim 8 wherein the genetic material is  
2 bound to chromophore in aerobic conditions.

1           17.    The process as recited in claim 8 wherein the genetic material is bound to  
2 chromophore in anaerobic conditions.

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Parameter	Value	Unit
Temperature	25.0	°C
Pressure	1.0	atm
Flow rate	1.0	L/min
Concentration	0.1	mol/L
pH	7.0	
Wavelength	254	nm
Scan rate	1.0	nm/min
Integration time	1.0	s
Resolution	0.5	nm
Slit width	1.0	mm
Detector	Photodiode array	
Software	Chromatography	
Hardware	PC/AT	
Manufacturer	Shimadzu	
Model	10A	
Year	1990	
Location	University of Tokyo	
Address	7-3-1 Hongo, Bunkyo-ku, Tokyo 113, Japan	
Phone	03-5841-3211	
Fax	03-5841-3211	
E-mail	shimadzu@shimadzu.co.jp	
Web site	http://www.shimadzu.co.jp	
Notes	This instrument is a Shimadzu 10A UV-Visible Spectrophotometer. It is a double-beam, scanning, photodiode array spectrophotometer. The instrument is equipped with a 254 nm mercury lamp and a 1.0 mm quartz cell. The scan rate is 1.0 nm/min. The integration time is 1.0 s. The resolution is 0.5 nm. The slit width is 1.0 mm. The detector is a photodiode array. The software is Chromatography. The hardware is PC/AT. The manufacturer is Shimadzu. The model is 10A. The year is 1990. The location is University of Tokyo. The address is 7-3-1 Hongo, Bunkyo-ku, Tokyo 113, Japan. The phone is 03-5841-3211. The fax is 03-5841-3211. The e-mail is shimadzu@shimadzu.co.jp. The web site is http://www.shimadzu.co.jp.	